

## **AMENDMENTS TO THE DRAWINGS**

Please amend Figure 1 to include the label “processing unit” for item 5, and to reposition reference numeral 5 accordingly. The drawing amendments are described in the application as originally filed at Paragraph [0019]. No new matter has been added.

Please amend Figure 3 to include the label “voxel intensity” for the x-axis, and the label “Yb” for the y-axis. The drawing amendments are described in the application as originally filed at Paragraphs [0016] and [0035-0038]. No new matter has been added.

## REMARKS / ARGUMENTS

### Status of Claims

Claims 1-28 are pending in the application. Claims 1-6, 13-16, 18-21 and 24-27 stand rejected. Claims 7-12, 17, 22, 23 and 28 are objected to as being dependent upon a rejected base claim but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Applicant appreciates the Examiner's comments regarding the allowability of the noted claims. Applicant has amended Claims 18 and 24, and has added new Claim 29, leaving Claims 1-29 for consideration upon entry of the present Amendment.

Applicant respectfully submits that the rejections under 35 U.S.C. §112, first paragraph, and 35 U.S.C. §103(a), have been traversed, that no new matter has been entered, and that the application is in condition for allowance.

### Status of Drawings

The drawings filed on March 7, 2002, are objected to.

The Examiner comments that Figure 4 does not contain any labels to item 5 in the drawing, and requires a corrected drawing sheet. Paper 20050214, page 2.

Although the Examiner makes reference to Figure 4, Applicant believes the correct reference should be to Figure 1 since it is Figure 1 that includes reference numeral 5. Accordingly, Applicant has amended Figure 1 to include the label "processing unit" for item 5, and to reposition reference numeral 5 accordingly, as suggested by the Examiner. The drawing amendments are described in the application as originally filed at Paragraph [0019]. No new matter has been added.

The Examiner comments that Figure 3 does not contain any labels to the x-axis and the y-axis in the drawings, and requires a corrected drawing sheet. Paper 20050214, page 2.

Applicant has amended Figure 3 to include the labels as suggested by the Examiner. The drawing amendments are described in the application as originally filed at Paragraphs [0016] and [0035-0038]. No new matter has been added.

In view of the foregoing, Applicant submits that the drawings are in compliance with 37 CFR 1.84, and respectfully requests reconsideration and withdrawal of these objections.

**Rejection Under 35 U.S.C. §112, First Paragraph**

Claims 4-12 are rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the enablement requirement. The Examiner alleges that after reviewing the specification, it is not understood what the meaning of “weighting law” is in Claims 4-9 [12]. The Examiner further alleges that the description makes no note of “weighting law”, and that the Examiner can interpret the meaning for “weighting law” as gravity on the human body, or a function rule. Paper 20050214, pages 3-4.

Appellant respectfully disagrees with the Examiner’s rejection for the following reasons.

The specification need describe the invention only in such detail as to enable a person skilled in the most relevant art to make and use it. With regard to lack of enablement, the question is whether the scope of enablement, provided one of ordinary skill in the art by the disclosure, is commensurate with the scope of protection sought by the claims. *In re Geerdes*, 180 USPQ 789 at 793 (CCPA 1974) (citing *In re Coleman*, 472 F.2d 1062, 176 USPQ 522 (CCPA 1973)).

Patentable subject matter should be defined with a reasonable degree of particularity and distinctiveness, and some latitude in the manner of expression and the aptness of terms should be permitted even though the claim language is not as precise as the Examiner might desire. MPEP 2173.02 (emphasis in the original).

The Examiner alleges that the description makes no note of “weighting law”, when in fact the specification at Paragraphs [0035-0038] clearly describes with a *reasonable* degree of particularity and distinctiveness to one of ordinary skill in the art

that the function  $Y_b$  is an expression for the “weighting law” in alternative language.

At Paragraph [0037] and at Figure 3, Applicant describes and illustrates function  $Y_b$  that is a linear function of the voxel intensities. Claims 4-6 are directed to a “weighting law” (such as  $Y_b$ ) that is a linear function of the voxel intensities. Accordingly, Applicant submits that the specification as originally filed is commensurate with the scope of protection sought by the claims, albeit in alternative language.

At Paragraph [0038] and at Figure 3, Applicant describes and illustrates function  $Y_b$  that increases less markedly than the aforementioned linear function of intensity. Claims 7-9 are directed to a “weighting law” (such as  $Y_b$ ) that increases less markedly than the aforementioned linear function of intensity. Accordingly, Applicant submits that the specification as originally filed is commensurate with the scope of protection sought by the claims, albeit in alternative language.

Also at Paragraph [0038] and at Figure 3, Applicant describes and illustrates function  $Y_b$  that corresponds to the square root function for voxel intensities outside of the aforementioned linear function intensity range. Claims 10-12 are directed to a “weighting law” (such as  $Y_b$ ) that corresponds to the square root function for voxel intensities outside of the aforementioned linear function intensity range. Accordingly, Applicant submits that the specification as originally filed is commensurate with the scope of protection sought by the claims, albeit in alternative language.

At paragraphs [0037-0038] and at Figure 3, Applicant describes and illustrates function  $Y_b$  having a linear component and a non-linear component, which is also reflected in the language of Claims 4-12. While Applicant has chosen to use the term  $Y_b$  in the specification and the term “weighting function” in the claims, it would be clear to one of ordinary skill in the art what Applicant meant, as evidenced by the clear language of the specification that parallels that of the respective claims.

In view of the foregoing, Applicant submits that the scope of the claimed invention is commensurate with the disclosure contained within the specification and drawings as originally filed, and respectfully requests that the Examiner reconsider and withdraw this rejection, which Applicants considers to be traversed.

**Rejections Under 35 U.S.C. §103(a)**

Claims 1-6, 13-16, 18-21 and 24-27 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Watanabe (U.S. Patent No. 6,760,611, hereinafter Watanabe) and Azuma et al. (U.S. Patent No. 6,839,457, hereinafter Azuma) and Harms et al. (U.S. Patent No. 5,415,163, hereinafter Harms).

Regarding independent Claims 1 and 18, the Examiner alleges that Azuma teaches aspects of the claimed invention, that Watanabe teaches aspects of the claimed invention, and that the difference between the instant claims and Azuma and Watanabe is the “merging the two models, weighting their voxels so as to increase the contrast between the images of the masked model and the images of the subtracted model, and summing the voxels thus weighted.” To cure the deficiencies of Azuma and Watanabe, the Examiner looks to Harms, and alleges that Harms provides the motivation that a combination of the two models would be obvious to one of ordinary skill in the art. The Examiner also alleges that Harms further teaches merging the two models, and weighting their voxels so as to increase the contrast between the images of the masked model and the images of the subtracted model. Paper 20050214, pages 5-6.

Regarding dependent Claims 2-6, 13-16, 19-21 and 24-27, the Examiner alleges that Azuma and Watanabe and Harms discloses the claimed elements. Paper 20050214, pages 7-15.

Applicant traverses these rejections for the following reasons.

Applicant respectfully submits that the obviousness rejection based on the References is improper as the References fail to *teach or suggest each and every element of the instant invention*. For an obviousness rejection to be proper, the Examiner must meet the burden of establishing a prima facie case of obviousness. *In re Fine*, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988) (Emphasis added). The Examiner must meet the burden of establishing that all elements of the invention are taught or suggested in the prior art. MPEP §2143.03.

Regarding Claims 1 and 18

At the outset, Applicant submits that independent Claims 1 and 18 are directed to a method and apparatus involving ***radiography images*** that involves a masked model and a subtracted model, which Applicant describes at Paragraphs [0003-0005] as being particular to ***radiography***. Dependent claims inherit all of the limitations of the respective parent claim.

In looking to Azuma for disclosure of the ***radiographic masked model***, the Examiner makes reference to Azuma at col. 2 lines 54-60. Paper 20050214, page 4.

At col. 2 lines 54-60, and contrary to the Examiner's allegations, Applicant finds Azuma to teach an evaluation of three-dimensional bone-related information that involves a method used to extract a separated cortical bone portion three-dimensional image and a separated cancellous bone portion three-dimensional image at high speed using ***computed tomography (CT)***, and does not find Azuma to teach the claimed ***radiographic masked model that is particular to radiography***.

In contrast with the claimed invention, Applicant finds Azuma to teach a bone measuring method that uses ***computed tomography (CT)*** (col. 4 line 67 through col. 5 line 1), and not a method for processing ***vascular radiographic images using a radiographic masked model particular to radiography***.

In looking to Watanabe for disclosure of the ***radiographic subtracted model***, the Examiner makes reference to Watanabe at col. 1 lines 41-48. Paper 20050214, page 5.

At col. 1 lines 41-48, and contrary to the Examiner's allegations, Applicant finds Watanabe to teach ***NMR (nuclear magnetic resonance) imaging*** to image a blood vessel, and does not find Watanabe to teach the claimed ***radiographic subtracted model that is particular to radiography***.

In contrast with the claimed invention, Applicant finds Watanabe to teach ***magnetic resonance imaging (MRI)*** and a method and device for obtaining a plurality of ***subtracted NMR signal groups*** with respect to a standard NMR signal group (title and abstract), and not a method for processing ***vascular radiographic images using a radiographic subtracted model particular to radiography***.

In looking to Harms to cure the deficiencies of Azuma and Watanabe, the Examiner makes reference to Harms at col. 10 lines 25-30, alleging that Harms teaches ***merging the two models***, and weighting their voxels so as to increase the contrast between the images of ***the masked model*** and the images of ***the subtracted model***, and makes reference to Harms at col. 3 lines 19-24 and col. 14 lines 31-37, alleging that Harms teaches summing the voxels thus weighted. Paper 20050214, page 6.

At col. 10, lines 12-30, and contrary to the Examiner's allegations, Applicant finds Harms to teach ***MR imaging*** that involves diagnostic examinations of musculoskeletal masses and bone marrow abnormalities that can be used in reconstructed slice method or combined with image processing to render three dimensional viewing, lesion specific analysis, and/or vascular images, and does not find Harms to teach ***merging the radiographic masked model and the radiographic subtracted model that are both particular to radiography***.

In contrast with the claimed invention, Applicant finds Harms to teach a method for diagnosing and treating tissue suspected of containing a lesion using magnetic resonance imaging (MRI) (abstract), and not a method for processing ***vascular radiographic images by merging a radiographic masked model and a radiographic subtracted model that are both particular to radiography***.

Accordingly, Applicant submits that Azuma, Watanabe and Harms, which are directed to either ***computed tomography (CT)*** or ***magnetic resonance imaging (MRI)***, and taken either singly or in combination, are absent a teaching of a ***radiographic masked model***, a ***radiographic subtracted model***, a ***merging of the radiographic masked and the radiographic subtracted models***, a ***weighting of their voxels***, and a ***summing of the voxels thus weighted***, which are specifically claimed for in the instant invention that is specifically directed to ***radiographic imaging***.

Absent a teaching or suggestion of each and every element of the claimed invention, the References cannot properly be used to establish a prima facie case of obviousness. Accordingly, and at least for these reasons, Applicant respectfully requests reconsideration and withdrawal of these rejections.

Furthermore, Applicant respectfully submits that an Examiner cannot establish obviousness by locating references which describe various aspects of a patent Applicant's invention without also providing evidence of the motivating force which would impel one skilled in the art to do what the patent Applicant has done. *Ex parte Levengood*, 28, USPQ2d 1300, 1302 (Bd.Pat.App.Int., 1993). References may not be combined indiscriminately. It is not enough for a valid rejection to view the prior art in retrospect once an Applicant's disclosure is known. The art applied should be *viewed by itself to see if it fairly disclosed doing what an Applicant has done*. *In re Skoll*, 187 USPQ 481, 484 (CCPA, 1975) (citing *In re Schaffer*, 108 USPQ 326, 328-29 (CCPA, 1956)) (Emphasis added). "The test for an implicit showing [of obviousness] is what the combined teachings, knowledge of one of ordinary skill in the art, and the nature of the problem to be solved *as a whole* would have suggested to those of ordinary skill in the art." (Emphasis added). *In re Kotzab*, 217 F.3d 13645, 1370, 55 USPQ2d 1313, 1317 (Fed. Cir. 2000).

Azuma teaches a bone measuring method using *computed tomography* (abstract, and best mode for carrying out the invention), Watanabe teaches *magnetic resonance angiographic imaging* (abstract), and Harms teaches *magnetic resonance imaging* of tissue suspected of containing a lesion (abstract). In stark contrast with the claimed invention, none of the References teach, suggest, or motivate one skilled in the art to arrive at the claimed invention that is directed to the *processing of radiographic images* involving a *radiographic masked model*, a *radiographic subtracted model*, the *merging of these two models*, and the *weighting and summing of their voxels*. Only through the teaching of the instant application does one arrive at the claimed invention.

In considering the different technologies of *computed tomography (CT)*, *magnetic resonance (MR)*, and *radiography*, one skilled in the art will appreciate that different signal processing techniques are involved, and that signal processing techniques suitable to CT or MR are not necessarily suitable to radiography.



Accordingly, and at least for these reasons, Applicant submits that no motivation can be found in any of the References to combine the technologies of the References to arrive at the claimed invention, and that the Examiner has improperly combined the References since there is no evidence of a motivating force that would impel one skilled in the art to do what the patent Applicant has done. Accordingly, and at least for these reasons, Applicant respectfully requests reconsideration and withdrawal of these rejections.

Additionally, Applicant respectfully submits that the Examiner cannot establish obviousness where nothing in the references alone or together suggests the claimed invention as *a solution to the problem disclosed in the instant application*. That the claimed invention may employ known principles does not itself establish that the invention would have been obvious. *Lindemann Maschinenfabrik GmbH v. American Hoist & Derrick Co.*, 730 F.2d at 1462, 221 USPQ 481 at 488 (Emphasis added). It is not enough to merely consider similar known principles employed by the claimed invention and the prior art, it is the claimed invention as a whole and the problem being solved that must be viewed in light of the prior art.

At Paragraph [0046], Applicant discloses that images obtained by an embodiment of the invention are similar to those that can be obtained by CT angiography. Accordingly, where a medical facility having radiography equipment but absent CT or MR equipment may be faced with the problem of not being able to generate CT or MR images, embodiments of this invention provide a solution to that problem. Since the References of Azuma, Watanabe and Harms are directed to CT and/or MR, they necessarily cannot recognize the problem recognized and solved only by this invention.

Accordingly, and at least for these reasons, a prima facie case of obviousness cannot be established where the references do not recognize a solution to a problem only recognized and solved by the instant application.

Yet furthermore, Applicant respectfully submits that “to establish obviousness based on a combination of the elements disclosed in the prior art, there must be some motivation, suggestion or teaching of the desirability of making the specific combination that was made by the applicant.” *In re Werner Kotzab*, CITATION (citing: *In re Dance*, 48 USPQ2d 1635, 1637 (Fed. Dir. 1998); *In re Gordon*, 221 USPQ 1125, 1127 (Fed. Cir. 1984). There must also be a *reasonable expectation of success* in modifying or combining the prior art, determined from the vantage point of the skilled artisan at the time the invention was made. *In re Fine*, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988); *In re Wilson*, 165 USPQ 494, 496 (CCPA 1970); *Amgen v. Chugai Pharmaceuticals Co.*, 927 USPQ2d 1016, 1023 (Fed. Cir. 1996) (Emphasis added). And, there must be some degree of predictability in showing the reasonable expectation of success. *In re Rinehart*, 189 USPQ 143 (CCPA 1976); MPEP §2143.03.

As previously discussed, Applicant submits that Azuma teaches a bone measuring method using *computed tomography (CT)* (abstract, and best mode for carrying out the invention), Watanabe teaches *magnetic resonance (MR) angiographic imaging* (abstract), and Harms teaches *magnetic resonance (MR) imaging* of tissue suspected of containing a lesion (abstract). Since none of the References teach processing techniques for *radiographic imaging*, Applicant submits that there cannot be any reasonable expectation of success in combining the References as suggested by the Examiner to arrive at the claimed invention. With CT and MR being substantially different technologies as compared to radiography, one skilled in the art cannot be assured that all procedures used in one is equally effective in another.

Accordingly, and in view of the foregoing, a prima facie case of obviousness cannot be established where it is the instant application that teaches the combination of elements claimed, and not the cited References, and where the References fail to offer any reasonable expectation of success in combining the References to perform as the claimed invention performs. Accordingly, and at least for these reasons, Applicant respectfully requests reconsideration and withdrawal of this rejection.

In view of the foregoing, Applicant submits that the References fail to teach or suggest each and every element of the claimed invention, fail to motivate one skilled in the art to do what the patent Applicant has done, fail to recognize a problem recognized and solved only by the present invention, fail to offer any reasonable expectation of success in combining the References to perform as the claimed invention performs, and discloses a substantially different invention from the claimed invention, and therefore cannot properly be used to establish a prima facie case of obviousness. Accordingly, Applicant respectfully requests reconsideration and withdrawal of this rejection.

Regarding Claims 2-6, 13-16, 19-21 and 24-27

Applicant respectfully submits that if an independent claim is non-obvious, then any claim depending therefrom is non-obvious. MPEP §2143.03 referencing *In re Fine*, 5 USPQ2d 1596 (Fed. Cir. 1988).

Applicant has provided clarifying remarks above regarding the non-obviousness of independent Claims 1 and 18.

In view of the foregoing, Applicant respectfully submits that the References cannot properly be used to establish a prima facie case of obviousness against the instant invention. Accordingly, Applicant respectfully requests reconsideration and withdrawal of this rejection.

Regarding Allowable Subject Matter

Applicant appreciates the Examiner's comments regarding the allowability of Claims 7-12, 17, 22, 23 and 28, if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

However, in view of the foregoing, Applicant respectfully submits that with allowance of the parent claims, allowance of the subject claims will follow without amendment.

Accordingly, Applicant respectfully requests notice of allowance thereof.

**Regarding Claims 18 and 24**

Applicant has amended Claim 18 for form, and Claim 24 to correct typographical errors, without prejudice. These claim amendments are not intended to narrow the scope of the respective claim in any way.

**Regarding New Claim 29**

Applicant has added new Claim 29, which is dependent on Claim 1, and which includes additional limitations that even more specifically describes the subject matter regarded as the invention.

In view of the previous discussion relating to Claim 1, Applicant respectfully submits that the References do not teach or suggest the claimed invention, and do not motivate one to arrive at the claimed invention.

Accordingly, Applicant submits that new Claim 29 is directed to allowable subject and respectfully requests entry and notice of allowance thereof.

In light of the forgoing, Applicant respectfully submits that the Examiner's rejections under 35 U.S.C. §112, first paragraph, and 35 U.S.C. §103(a), have been traversed, and respectfully request that the Examiner reconsider and withdraw these rejections.

The Commissioner is hereby authorized to charge any additional fees that may be required for this amendment, or credit any overpayment, to Deposit Account No. 50-2513.

In the event that an extension of time is required, or may be required in addition to that requested in a petition for extension of time, the Commissioner is requested to grant a petition for that extension of time that is required to make this response timely and is hereby authorized to charge any fee for such an extension of time or credit any overpayment for an extension of time to the above identified Deposit Account.

Respectfully submitted,

CANTOR COLBURN LLP

Applicant's Attorneys

By: 

David Arnold  
Registration No: 48,894  
Customer No. 23413

Address: 55 Griffin Road South, Bloomfield, Connecticut 06002  
Telephone: (860) 286-2929  
Fax: (860) 286-0115